Abstract

Charles University in Prague, Faculty of Pharmacy in Hradec Králové
Department of Analytical Chemistry
Candidate: *Michaela Mudrová*
Supervisor: *Doc. PharmDr. Lucie Nováková, Ph. D.*
Title of Diploma thesis: *Development of fast UHPLC-MS/MS method for determination of catechins and caffeine in tea samples*

This thesis addresses finding of optimal conditions for qualitative and quantitative evaluation of catechins and caffeine in commonly consumed teas using the UHPLC-MS/MS method.

Catechins are thermosensitive and photosensitive substances and this had to be taken into account while finding the optimal conditions. The stock solutions of analytes were stored in cold and in dark vials for the period of one week.

Nine analytes were evaluated while finding the optimal conditions, eight catechins and caffeine. Measurements were performed on UHPLC instrument made by Waters with tandem mass spectrometer of triple quadrupole type Quattro Micro. The tested UHPLC conditions were mobile phase composition and composition of mixture used to dilute the analytes. Parametres of mass spectrometer were set up as follows: ion source parametres (capillary voltage, cone voltage, extractor voltage and RF lens voltage) and the most significant ion transitions were selected (selection of precursors, fragments and optimization of collision energy).

UHPLC separation was taking place on the ACQUITY CSH C18 (2.1 x 100 mm, 1.7 µm) column with 0,45 ml/min flow rate of the mobile phase. Gradient elution was used for measurements. Mobile phase consist of a water (0,1% HCOOH in water) and organic (0,1% HCOOH in methanol) components.

This method was validated. Validation included SST, linearity, the range of the method, precision, accuracy and size of matrix effects. The method was used to evaluate 45 kinds of teas - white, green and black (15 teas of every type). Green teas showed the highest contents of catechins, then white and black teas. The highest content of caffeine was found in black teas.

The advantages of this method are rapidity of analysis (about few minutes), accuracy and precision of the results. This method can be used for comparison of contents of catechins and caffeine in different types of tea, tea beverages, foodstuffs or dietary supplements.

Keywords: UHPLC, MS/MS, catechins, caffeine, tea